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MODEL VMDE-200 ANI ENCODER/DECODER

GE Star® AND MDC-1200®, IDENTIFICATION ENCODER/DECODER AND DTMF ENCODER for VERTEX/STANDARD RADIOS

Instruction Manual

Manual Number 05 30 0020
Rev 101022

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MODEL VMDE-200 ANI ENCODER/DECODER
for Vertex/Standard Radios

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C H A P T E R 1
Features

What Is the VMDE-200

The Cimarron Technologies Model VMDE-200 is a plug-in ANI encoder/decoder module capable of PTT ANI and Emergency ANI in GE Star®, MDC-1200® or DTMF signaling format in Vertex communications radios. The unit provides Automatic Numeric Identification of a specific radio transmitter each time the microphone press-to-talk (PTT) switch is activated. Emergency messages are sent by depressing the designated emergency button for greater than a programmed period. Automatic Man Down reporting is supported with the use of an optional mercury tilt switch. Manual DTMF generation is available as well as automatic ANI. The VMDE-200 is also capable of generating and acting upon more complex GE Star and MDC-1200 messages like selective calls, radio disables, commanded open microphone monitoring and privacy communications. The VMDE-200 displays received GE Star and MDC-1200 ANI on the radio LCD. Decode functions are not supported in DTMF signaling format.

Capabilities

- Identify every transmission source with the assigned ANI ID in Signaling formats of MDC-1200®, GE Star® and DTMF
- Manual button press DTMF generation
- Programmable automatic radio key-up with DTMF keypad presses
- Programmable ANI PTT repeat timer limits data bursts during continued conversations
- “Go-ahead” beep sounds when ready for voice transmission
- Courtesy beep transmitted when radio is unkeyed
- Emergency message sent with emergency button press
- Programmable open microphone monitor during emergency
- Stuck microphone identification
- Time-Out-Timer with alert tone
- ANI sent at beginning, end or both
- Capable of displaying and recalling Alpha-numeric Aliases instead of numeric ID’s for both transmit and receive. The Alias feature handles over 500 aliases
- Over the air activated open microphone monitor transmits ambient noise for 15 seconds
- Over the air activated radio disable and enable
- Sends and receives Selective call, group call and all call messages

- Automatic man-down alarm reporting with unique coding for GE Star® and DTMF
- Status and canned messages can be programmed instead of the emergency and man-down reporting
- Decodes and displays the ANI of the person transmitting
- Receiver data mute
- MDC-1200® message adaptability enhances compatibility with existing unique systems

Specifications

Data Format	GE Star®	MDC-1200®	DTMF
Modulation Type	PSK (Phase Shift Key)	FSK	DTMF
Rate	400 bps on 1600hz carrier	1200 bps, 1200/1800 Hz	Character duration and pause 25mS/step, 1000mS max
ID Range	0001 to 16,383	0001-DEEE	0001-FFFFFFFF
Aliasing	254 entries maximum	254 entries maximum	n/a
ID Locations	ANI at Beginning, End or Both		
Messages	PTT ANI, Emergency, Man-Down, TOT. Messages can be changed to any allowable GE Star® message. Selective Call, Selective Call Cancel, Radio Check.	PTT ANI, Emergency. Man-Down sends Emergency. Short Call Alert, Long Call Alert, Voice Select Call, Radio Check. Messages can be redefined for specialized systems.	PTT ANI, Emergency, Man-Down
Sidetone	1 KHz during attack delay and transmission of data.		
Burst Length	3 ½ messages each.	Fixed length 180mS	Character duration and pause in 25mS/step, 1000mS max
Preamble Length	24 bits.	Fixed length	N/A
Attack Delay	0 mS to 1000 mS programmable in 50 mS steps.		
ANI Repeat Timer	(Time since last PTT press. If less, don't send ANI) Programmable 0 S (Send every PTT); 10 S; 20 S; 40 S; 60 S; 90 S; 120 S.		
Programming	Programmed via Vertex/Standard CE-73 programming software.		
Radio Interface	Connects to mating accessory port on host radio		
Supply Voltage	3.6 VDC.		
Supply Current	5 mA constant.		
Temperature	Operating: -30^{o}C to +60^{o}C.		
Humidity	0% to 95% RH (non-condensing).		

C H A P T E R 2
Programming

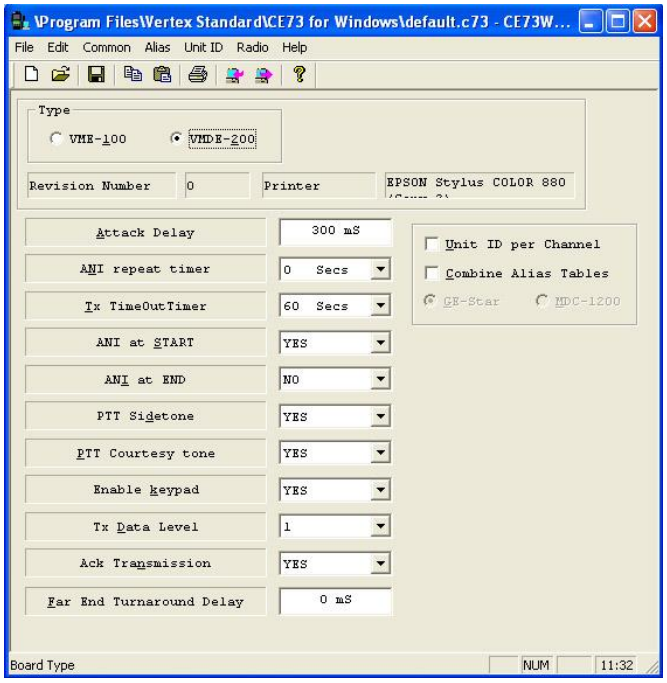
CE-73 Programming Software

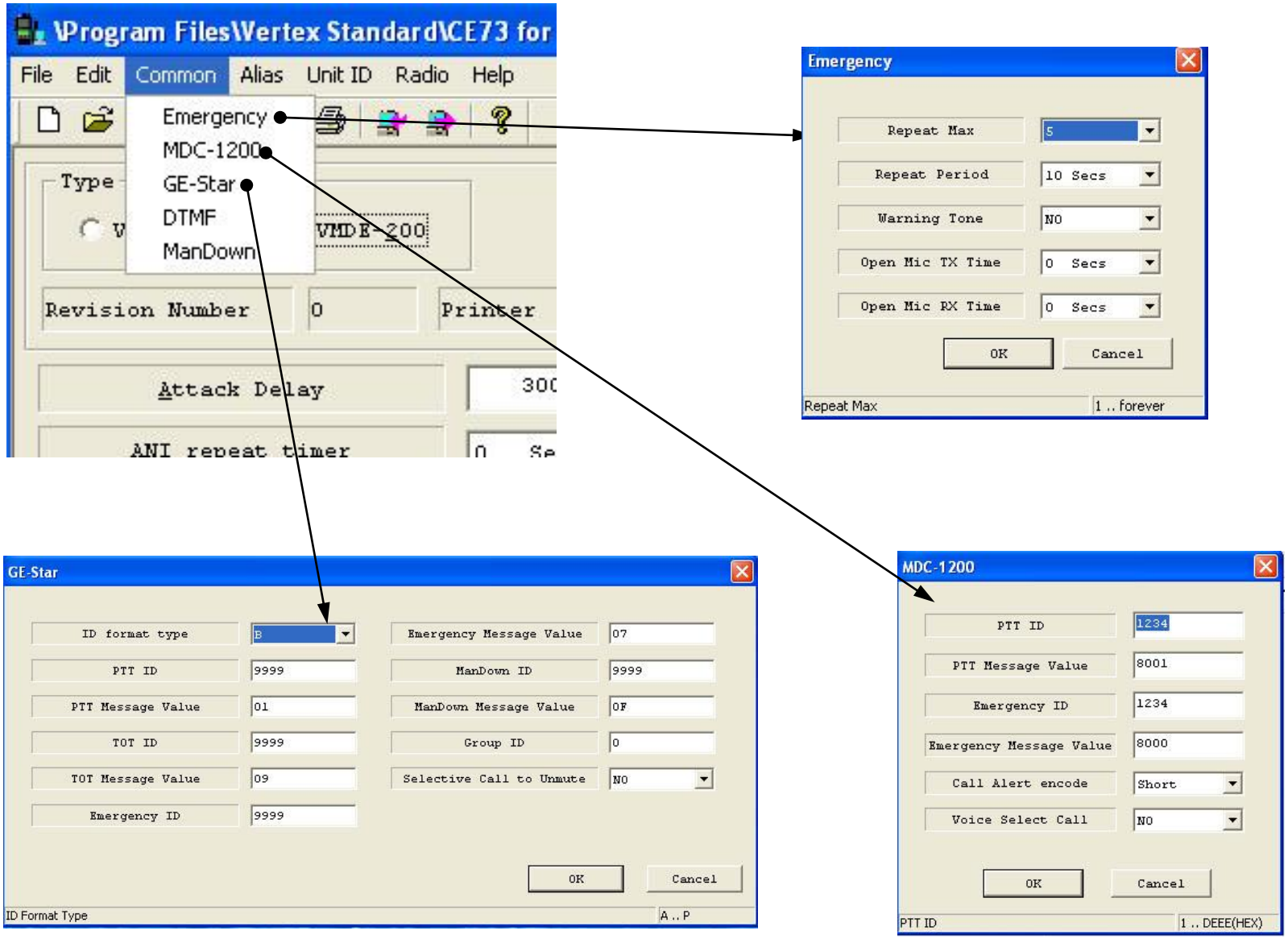
The VMDE-200 is programmed while installed in the host radio. This is accomplished by placing the host radio into sub-clone mode and then attaching the appropriate programming cable and opening the CE-73 software. The radio must be in sub-clone mode before attempting upload or download. Refer to the following table for radio specifics:

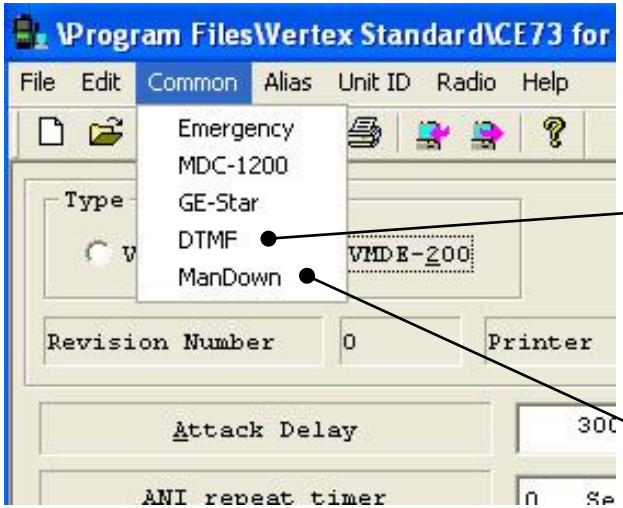
Radio Model	Programming Software	Firmware Version	Sub Clone Procedure	Sub Flash Procedure	Optimum TX level setting
VX-410/420	CE-64 Ver 1.10	1.2	[PTT] + [Side 2] + Pwr on	N/A	1
VX-537	CE-65 Ver 1.05	1.14	[PTT] + [Top Orange] + Pwr on	N/A	2
VX-600/900	CE-39 Ver 1.25	1.53	[PTT] + [Top Orange] + Pwr on	[Top Orange] + Pwr on	1
VX-800	CE-31 Ver 1.18	1.54	[PTT] + [Top Orange] + Pwr on	N/A	1
VX-820/920	CE-59 Ver 2.25	1.59	[PTT] + [Top Orange] + Pwr on	N/A	3
VX-4100	CE-59 Ver 2.25	1.85	[▲] + Pwr on	N/A	3
VX-4200	CE-59 Ver 2.25	1.85	P3 + Pwr on	N/A	3

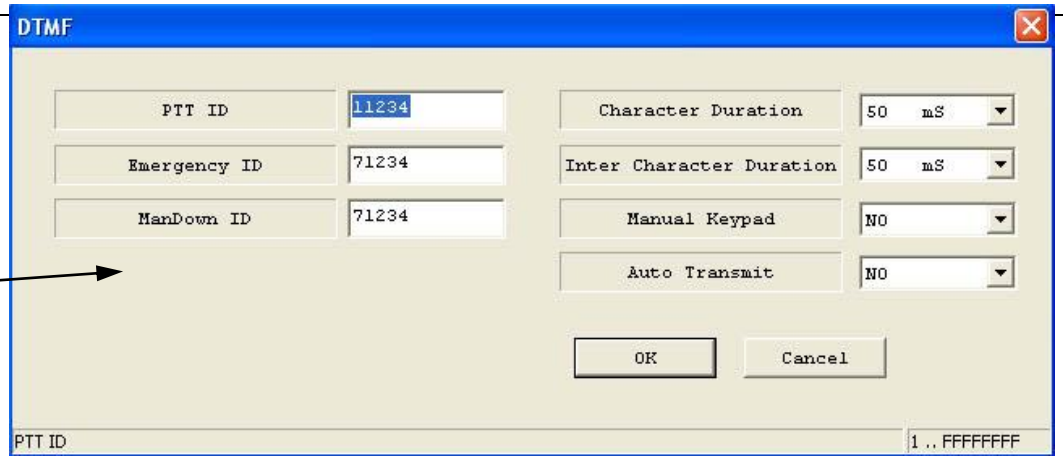
Sub flash mode is available only on the VX-900 and is a method which allows rapid reflashing of VMDE firmware. Refer to page 34 for more information. Optimum TX level setting refers to recommended “TX Data Level” setting which is further described in Programmable Parameters/definitions on page 16.

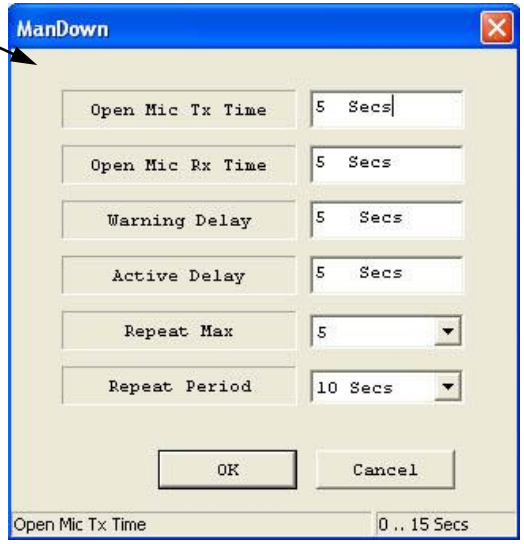
The CE-73 main menu is presented upon starting the software:

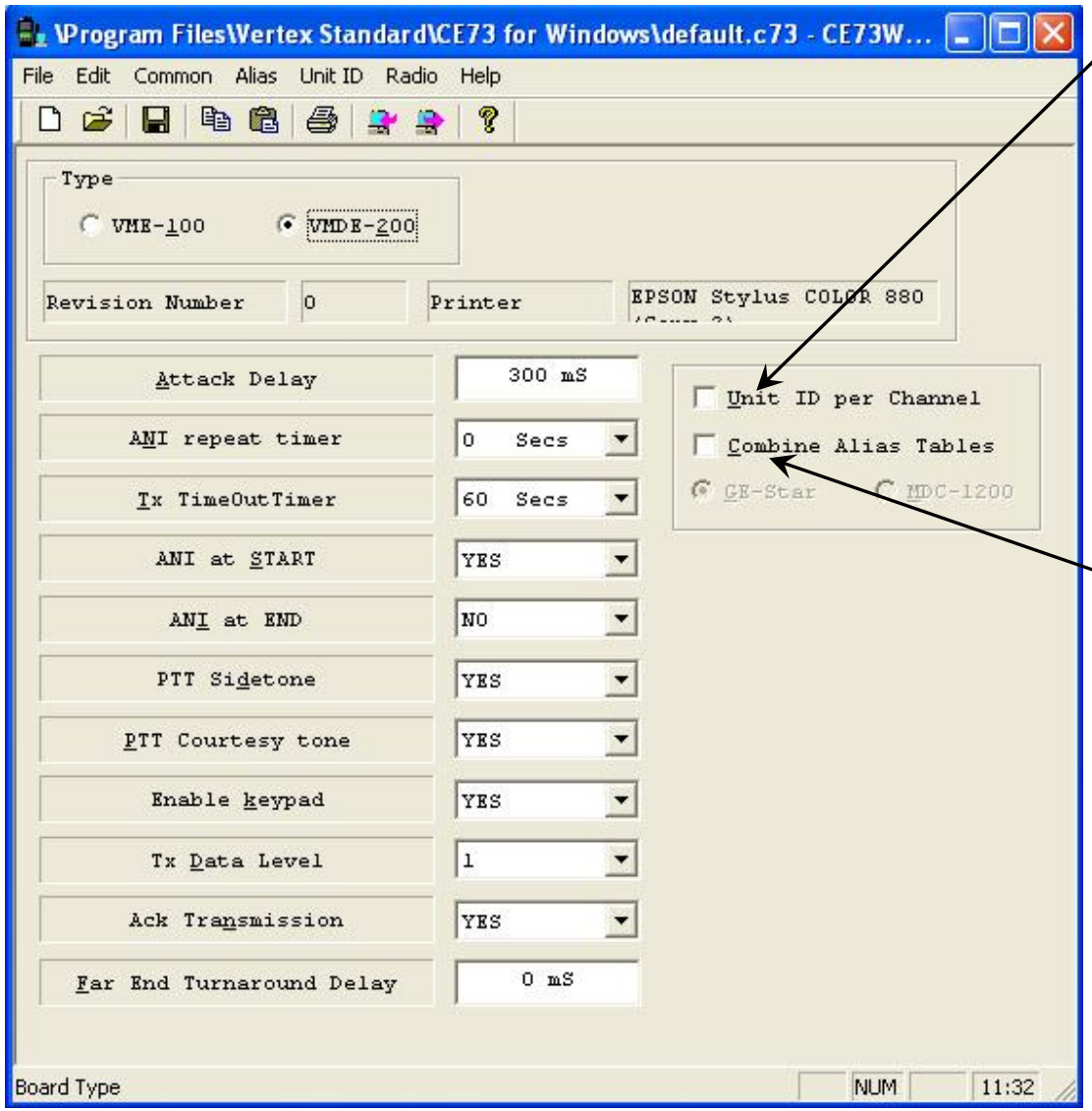



\Program Files\Vertex Standard\CE73 for
File
Edit
Common
Alias
Unit ID
Radio
Help
Emergency
MDC-1200
GE-Star
DTMF
ManDown
Type
VMDE-200
Revision Number
0
Printer
Attack Delay
ANI repeat timer
Emergency
Repeat Max
5
Repeat Period
10 Secs
Warning Tone
NO
Open Mic TX Time
0 Secs
Open Mic RX Time
0 Secs
OK
Cancel
Repeat Max
1 .. forever
GE-Star
ID format type
B
PTT ID
9999
PTT Message Value
01
TOT ID
9999
TOT Message Value
09
Emergency ID
9999
Emergency Message Value
07
ManDown ID
9999
ManDown Message Value
0F
Group ID
0
Selective Call to Unmute
NO
OK
Cancel
ID Format Type
A .. P
MDC-1200
PTT ID
1234
PTT Message Value
8001
Emergency ID
1234
Emergency Message Value
8000
Call Alert encode
Short
Voice Select Call
NO
OK
Cancel
PTT ID
1 .. DEEE(HEX)


\Program Files\Vertex Standard\CE73 for
File
Edit
Common
Alias
Unit ID
Radio
Help
Emergency
MDC-1200
GE-Star
DTMF
ManDown
Type
VMDE-200
Revision Number
0
Printer
Attack Delay
ANI repeat timer


DTMF
PTT ID
11234
Emergency ID
71234
ManDown ID
71234
Character Duration
50 mS
Inter Character Duration
50 mS
Manual Keypad
NO
Auto Transmit
NO
OK
Cancel
PTT ID
1 .. FFFFFFFF


ManDown
Open Mic Tx Time
5 Secs
Open Mic Rx Time
5 Secs
Warning Delay
5 Secs
Active Delay
5 Secs
Repeat Max
5
Repeat Period
10 Secs
OK
Cancel
Open Mic Tx Time
0 .. 15 Secs

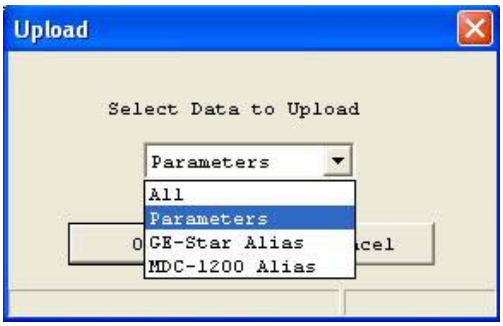


If the “Unit ID per Channel” box is checked, you will be able to click “Unit ID” in the menu bar and designate a different ANI ID on a per-channel basis. Only select radios support the “Per Channel ID” Feature. Contact Vertex/Standard for a list of supporting radios. If Unit ID per channel is checked, and the radio is placed on a channel where no ID is specified in the Unit ID/Channel table, then the ID listed under “Common” is used.

If the “Combine Alias Tables” box is checked, then the buttons “GE-Star” and “MDC-1200®” become available. The selction will allocate 508 alias entries to the selected signaling format instead of 254 entries per format.

Uploading and Downloading

Uploading transfers information from the VMDE-200 to the CE-73 programming software. Downloading transfers information from the CE-73 programming software into the VMDE-200. The software permits you to select which data you desire to transfer. "Parameters" transfers only the "Programmable Parameters" and does not deal with the alias tables. "All" will transfer the programmable parameters and both alias tables. This selection process allows you to transfer only the data that has changed or needs to be changed, potentially significantly reducing programming time.

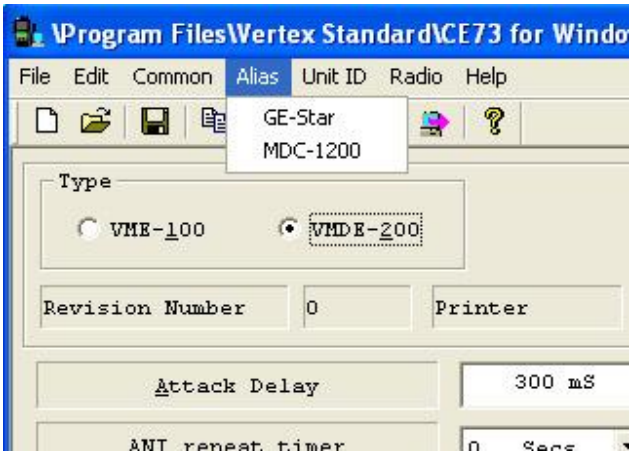


Aliasing

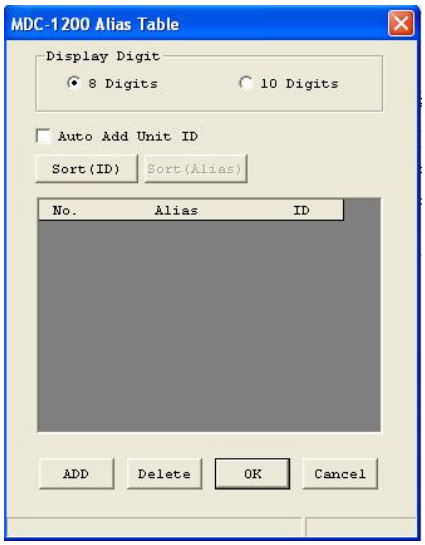
Aliasing is a method where alpha-numeric names can be related to actual unit ID numbers. In this manner, users see (and select) pre-determined names instead of ID numbers. For example, if unit 1234 is LADDER 6, an alias can be set up so that every time unit 1234 ANI is received, the radio displays LADDER 6 instead. Aliasing also affects transmit capabilities so that if a user wants to send a selective call to LADDER 6, they will select LADDER 6 and not "unit 1234".

Alias tables are generated using Vertex/Standard software CE-73. There are two independent alias tables available. One for GE Star® signaling and the other for MDC-1200® signaling.

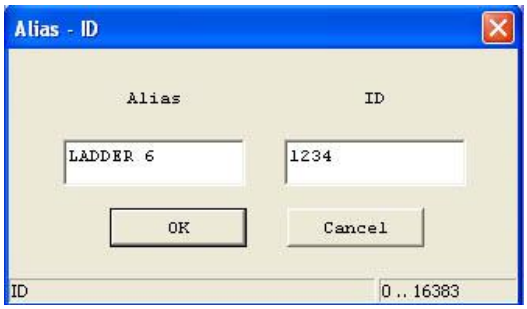
This figure shows how to access the alias tables by selecting "Alias" in the menu bar and then, selecting which table you desire to work with.



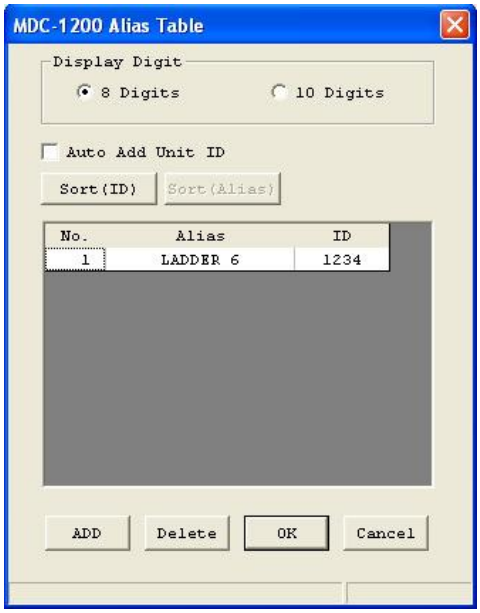
Once you select a format, the edit window appears as shown below. Note that there is a selection for 8 digit or 10 digit display types. Portable radios can handle 8 digit display lengths, while most mobiles allow 10 digit lengths.



To enter a new alias, press the ADD button. Enter the appropriate Alias and the associated ID and press OK.



The new entry is added to the list.



Continue until all entries have been made. The display can be sorted by (ID) or (Alias) to facilitate management.

Programmable Parameters

The following parameters are programmable using the Vertex/Standard supplied CE-73 programming software. Default values are italicized in brackets to the right of the parameter.

Main Menu

Attack Delay (N/A for end send) 0ms to 1000ms in steps of 50ms. *[Default 300mS]*

PTT ANI repeat timer (time since last PTT press. If less, don't send PTT ANI) (0=send every PTT; 10s, 20s, 40s, 60s, 90s, 120s) *[Default 0]*

TX Time out timer (30s, 60s, 90s, 120s) [*Default: 60s]*

ANI at START: Send ID at beginning (Y/N) *[Default Yes]*

ANI at End: Send ID at end (Y/N) *[Default No]*

PTT Sidetone (beginning send only) (Y/N) *[Default Yes]*

PTT courtesy tone (Y/N) *[Default No]*

Enable keypad (Y/N) *[Default Yes]*

TX Data Level (0,1,2,3) *[Default 1]*

Allow Acknowledgment Transmissions (Y/N) *[Default Yes]*

Far End Turn-around Delay (0mS to 2550 mS in 10 mS steps) *[Default 0 mS]*

Common – Emergency

Repeat Max: Number of repeat emergency transmissions. (1, 5, 10, 15, 20, forever) *[Default =5]*

Repeat Period: Time between emergency repeats. (5s, 10, 20, 30s) *[Default=10s]*

Warning Tone: Emergency TX warning tone (Y/N) *[Default No]*

Open Microphone Monitor on Emergency TX time (0s to 55s, 5s steps) *[Default 0s]*

Open Microphone Monitor on Emergency RX time (0s to 55s, 5s steps) *[Default 0s]*

Common – MDC-1200®

PTT ID (1 – DEEE) *[Default 1234]*

PTT Message value (0x0000-0xFFFF) *[Default 0x8001]*

Emergency ID (1 – DEEE) *[Default 1234]*

Emergency Message value (0x0000-0xFFFF) *[Default 0x8000]*

Call Alert Encode (Long/Short) *[Default Short]*

Voice Select Call (Y/N) *[Default No]*

Common – GE Star®

Format type (A through P) *[Default B]*

PTT ID (1 – 16383) *[Default 9999]*

PTT Message value (0x00-0x7F) *[Default 0x01]*

TOT ID (1 – 16383) *[Default 9999]*

TOT Message value (0x00-0x7F) *[Default 0x09]*

Emergency ID (1 – 16383) *[Default 9999]*

Emergency Message value (0x00-0x7F) *[Default 0x07]*

Man Down ID (1 – 16383) *[Default 9999]*

Man Down Message value (0x00-0x7F) *[Default 0x0F]*

Group ID (0 – 16383) *[Default 0]*

Selective Call to Unmute (Y/N) *[Default No]*

Common – DTMF

PTT ID (1 – FFFFFFFF) *[Default = 11234]*

Emergency ID (1 – FFFFFFFF) *[Default = 71234]*

Man Down ID (1 – FFFFFFFF) *[Default = 71234]*

Character duration (25mS through 1000 mS in 25 mS steps) *[Default 50 mS]*

Inter-character duration (25 mS through 1000 mS in 25 mS steps) *[Default 50 mS*]

Enable Manual Keypad DTMF (Y/N) *[Default Yes]*

Keypad auto transmit (Y/N) *[Default No]*

Common – ManDown

Open Microphone Monitor on Man Down TX time (0s to 55s, 5s steps) *[Default 0s]*

Open Microphone Monitor on Man Down RX time (0s to 55s, 5s steps) *[Default 0s]*

Man Down Warning Delay (0 – 255 S) *[Default 5 S]*

Man Down Activation Delay (0 – 255 S)*[Default 5 S]*

Number of repeat Man Down transmissions. (1, 5, 10, 15, 20, forever) *[Default =5]*

Time between Man Down repeats. (5s, 10, 20, 30s) *[Default=10s]*

Alias

Allows the entry of aliasing with separate tables for GE Star® and MDC-1200®. The appropriate table is used depending on the signaling format of the selected channel.

Definitions

Attack Delay:

The period of time from when the user keys the radio and the data begins to be transmitted. This delay allows the communications system to stabilize and be ready for transmission.

PTT ANI repeat timer:
Used to reduce the amount of data transmissions. If the selected time since the last PTT press is not exceeded, data is not transmitted with that PTT press.

Time out timer:
If the radio is held keyed up for greater than the selected time, the ID is transmitted and the radio is automatically unkeyed.

Send ID at beginning:
If programmed “Yes”, the ID will be transmitted when the user keys the radio.

Send ID at end:
If programmed “Yes”, the ID will be transmitted when the user unkeys the radio.

Sidetone with PTT ANI:
If programmed “Yes”, a tone will sound through the local speaker to advise the user to hold off talking. Prevents “Voice syllable clipping” which could occur during data transmission.

Unkey courtesy tone:
If programmed “Yes”, a tone will be transmitted when the user unkeys to inform the listener that they may now transmit.

Enable Keypad:
If programmed “No”, keypad presses are ignored.

TX Data Level:
Changes the data output level. Enter a value between 0 and 3 that provides a data deviation that is just below voice deviation.

Allow Acknowledgment Transmissions
Not all received messages require an acknowledgment transmission. If this feature is enabled, an acknowledgment will be transmitted whenever required.

Far End Turn-around Delay:
The period of time from when an acknowledgeable message is received and the acknowledge data packet is automatically sent. This delay allows the receiving radio to relax from transmit mode before receiving the data. Programmed attack delay will be subtracted from the delay time selected so that the radio will key up after waiting the time of (Far End Turn-around Delay) – (Attack Delay).

Number of repeat emergency transmissions:
Number of times that an emergency message is transmitted. (1, 5, 10, 15, 20, forever) The emergency message transmission will be repeated a programmed number of times with a programmed period between transmissions. The repeats will be transmitted regardless of radio status. If this value is set to 1 (one), the transmission will be considered a non-critical message instead of emergency.

Time between emergency repeats:
When in the emergency mode, if the number of repeat emergency transmissions is not “One”, this is the time that will be waited between emergency transmissions.

Emergency TX warning tone:

If programmed “Yes”, a warning tone will sound through the local speaker to advise the user that an emergency message is being transmitted.

Open Microphone Monitor on Emergency TX time

If not set to zero, once an emergency is activated, the radio will key up and transmit ambient noise for this period of time. It will then unkey and remain unkeyed for a programmed amount of time and then repeat the process. It will alternate between TX and RX throughout the emergency cycle. The length of the cycle is determined by the settings of “Number of repeat emergency transmissions” and “Time between emergency repeats”. If the value is set to zero, there will be no open microphone monitor.

Open Microphone Monitor on Emergency RX time

If open microphone monitor on emergency TX time is not set to zero, the radio will remain unkeyed for this period of time between TX times.

MDC-1200® PTT ID, Emergency ID

Generally, the PTT ID and the Emergency ID are the same; however, they could be programmed different if desired. A radio ID cannot contain the character F nor can it begin with the character E as these are defined as wildcards. However, a radio can encode to a target ID containing these characters.

MDC-1200® Call Alert Encode

MDC-1200® signaling defines two different types of Call Alert packets. The short call alert does not contain the originator ID and does not support many extended features. This selection affects which type will be used during MDC-1200® encoding. The VMDE-200 will decode either type. If the VMDE-200 receives a short call, no originator ID will be displayed on the radio. The selection is effective for all MDC-1200® signaling channels. (Different call types cannot be selected for different channels)

MDC-1200® Voice Select Call

In a system that uses Voice Select Call (VSC), all radios remain muted until a VSC command to their ID is received. Then the radio unmutes until loss of receive carrier. If this feature is enabled, the radio will remain muted unless a VSC command is received.

GE Star® format type

This selection defines which of the sixteen GE Star® formats are in use.

GE Star® PTT ID, Emergency ID

The actual maximum value depends on the GE Star® format type selected (1 – 16383). Generally, the PTT ID and the Emergency ID in GE Star® are the same; however, they could be programmed different if desired. A radio cannot be programmed for an ID of 0 (zero) but a radio can encode to a target ID of 0.

GE Star® Group ID

The actual maximum value depends on the GE Star® format type selected (0 – 16383) . A GE Star® “ALL CALL” is a selective call to ID 0 (zero) and is not re-definable. A group call can be any valid

number but must not be used as a PTT or Emergency ID on any radio in the system. The default is 0 (zero) which effectively means that there is no group call (only the all call).

GE Star® Selective Call to Unmute

This is similar to the MDC-1200® Voice Select Call. If this feature is enabled, the radio will remain muted unless a GE Star® Selective Call command is received.

DTMF PTT ID, Emergency ID

In DTMF signaling, the PTT ID and Emergency ID are different so the base can determine what is an emergency message. Systems with dispatch consoles generally define a DTMF PTT ID as a number beginning with a 1 and Emergency ID's begin with a 7.

DTMF character duration

This timer is active for PTT and Emergency ANI and DTMF Keypad Auto transmit mode (25 mS through 1000 mS in 25 mS steps). Each ANI character is generated for this amount of time.

DTMF inter-character duration

This timer is active only for PTT and Emergency ANI. The time selected is the silent gap between individual DTMF digit transmissions(25 mS through 1000 mS in 25 mS steps).

Enable Manual Keypad DTMF

If enabled, DTMF tones will be generated when keypad buttons are pressed with the radio keyed. The associated tone continues to be transmitted until the button is released. The radio microphone is muted for the duration of the button press. Enabling this feature and not designating ANI type for the channel will permit manual DTMF generation without PTT ANI.

DTMF Keypad auto transmit

If enabled, the radio will automatically go into transmit and DTMF will be generated when keypad buttons are pressed. ANI will not be generated for any automatic transmit session. After a button is released, the radio will remain keyed for one second to await further button presses. The length of the transmitted DTMF tone is the value programmed as "DTMF character duration". The radio microphone is muted for the duration of the function. If PTT ANI is enabled, the ANI will be generated as programmed (beginning send or end send) for radio PTT button presses.

Open Microphone Monitor on Man Down TX time

If not set to zero, once a Man Down is activated, the radio will key up and transmit ambient noise for this period of time(0s to 55s, 5s steps). It will then unkey and remain unkeyed for a programmed amount of time and then repeat the process. It will alternate between TX and RX throughout the Man Down cycle. The length of the cycle is determined by the settings of "Number of repeat Man Down transmissions" and "Time between Man Down repeats". If the value is set to zero, there will be no open microphone monitor.

Open Microphone Monitor on Man Down RX time

If open microphone monitor on Man Down TX time is not set to zero, the radio will remain unkeyed for this period of time between TX times(0s to 55s, 5s steps).

Man Down Warning Delay

Once the VMDE-200 senses a man down situation, this timer begins to run(0 – 255 S). If the radio is not uprighted within this period of time, a warning tone lasting 1 second is sounded. If the radio is uprighted, the warning timer resets.

Man Down Activation Delay

If the warning delay timer succeeds to complete its countdown and the warning tone is sounded, the activation delay timer begins to run(0 – 255 S). The activation delay timer is programmable 0 to 255 seconds. If the radio is not uprighted within this period of time, the radio will key up and send a message to the base.

Number of repeat Man Down transmissions

Number of times that a Man down message is transmitted. (1, 5, 10, 15, 20, forever) The man down message transmission will be repeated a programmed number of times with a programmed period between transmissions. The repeats will be transmitted regardless of radio status. If this value is set to 1 (one), the transmission will be considered a non-critical message instead of man down.

Time between Man Down repeats

Repeated Man Down transmissions will be separated by a programmed delay period between transmissions(5s, 10, 20, 30s).

Alias

The alias function relates a numeric ID to an alphanumeric “alias”. If the function is enabled, the associated alias will be presented instead of the actual ID. The alias will be used for all encode and decode functions. If an ID is received that does not have an associated alias, then the ID will be used. There are two independent Alias tables in the VMDE-200. One for MDC-1200® ID’s, and one for GE Star® ID’s. If the radio is on an MDC-1200® signaling channel, the MDC Alias table will be used. If it is on a GE Star® signaling channel, the GE Star® Alias table will be used. Each table has a maximum capacity of 254 entries. From the main menu, the two tables can be combined and dedicated to either of the signaling types. This will provide a total of 508 aliases for exclusive use of one signaling type.

Memory Characteristics

Programming parameters are stored in non-volatile memory and will be retained when the radio is turned off or when the battery is removed.

Radio Programming Software

The VMDE-200 board must be installed into the radio before attempting to use the associated radio programming software. This is so that the software detects the presence of the VMDE-200 and makes available additional options that are specific to the VMDE-200. Once uploading from the radio, go to the “Signaling” menu and under “ANI” select “Option ANI”. Now signaling formats GE Star®, MDC-1200® and DTMF will be available on a per-channel basis. The desired format is selected in the “SIG” column (not the ANI column) of the main programming window. Options are (-) = Off; (1) = GE Star®; (2) = MDC-1200®; (3) = DTMF.

C H A P T E R 3
Operation

Viewing the Programmed ID

To review the programmed ID on the channel selected, press the <#> (pound) key. The ID will de displayed for 5 seconds and then the display will return to the channel information presentation.

PTT ANI Operation

On specified radio channels, with the press of the PTT button, the VMDE-200 disables the radio microphone and then transmits the ANI ID. While the radio is transmitting the data, a tone sounds in the local speaker to advise the user to hold off talking. After the data is transmitted, the PTT sidetone stops and the microphone is activated. The digital burst can be programmed to occur when the PTT is first pressed, or when the PTT is released, or at both times. If the burst is programmed for transmission when the PTT is released or the radio is on a non signaling channel, a short “go ahead” beep will be heard and there will be no sidetone with data transmission. When the PTT is released and transmission is over, a courtesy beep is transmitted to inform the listener that they can now transmit.

The PTT Sidetone and courtesy beep can be individually deactivated in personality programming.

To reduce the amount of data transmissions, data can be programmed to not occur during continuing conversations. A value can be selected for the time since the last PTT press. If the selected time is not exceeded in subsequent key-ups, data is not sent. Programmable times are 0, 10s, 20s, 40s, 60s, 120s. *[Default = 0].* If the time selected is 0 (zero), ANI will be sent with every PTT press.

Emergency Message

An Emergency message is transmitted whenever the designated emergency button is held down for greater than the time programmed in the personality of the radio.

The emergency message ID can be programmed to be different than the radio PTT ANI. If the ID’s are different and an emergency message is sent, the VMDE-200 will expect an acknowledgment to the emergency ID not the PTT ID.

The emergency message transmission will be repeated a programmed number of times with a programmed period between transmissions. The repeats will be transmitted regardless of radio status. Available times are as follows:

Number of repeat emergency transmissions. (1, 5, 10, 15, 20, forever) *[Default = 5].* Time between emergency repeats. (5s, 10, 20, 30s) *[Default=10s].*

If desired, a warning tone can be sounded in the local speaker to advise the user that an emergency message has been sent.

In conjunction with a properly configured radio personality, the radio will change channels prior to sending the emergency message.

The emergency cycle is terminated at the conclusion of the repeats;

upon receipt of an acknowledgment or by pressing <A><D>. Cycling power also will terminate the cycle.

If the number of repeat transmissions is set to 1 (one), the transmission will be considered non-critical. The radio display will present “Msg Sent” instead of “Emrgency”. The message type can be changed to a unique value.

Man Down Capabilities

The VMDE-200 board contains wire feed-throughs for attaching wires to permit the connection of a man down sensing switch. The man down input terminals on the VMDE-200 are feed-throughs T1 and T2 where T1 is the high side and T2 is ground. T1 must not be attached to any point that exceeds 3.6 VDC or microprocessor damage will result.

The Man-Down message transmission is generally initiated by closure of a mercury switch located within a hand-held radio when the radio is continuously tipped greater than 60 degrees from vertical. There are two programmable timers associated with the man down feature.

Man Down Warning Delay

The man down warning delay is programmable 0 to 255 seconds. Once the VMDE-200 senses a man down situation, this timer begins to run. If the radio is not uprighted within this period of time, a warning tone lasting 1 second is sounded. If the radio is uprighted, the warning timer resets.

Man Down Activation Delay

If the warning delay timer succeeds to complete its countdown and the warning tone is sounded, the activation delay timer begins to run. The activation delay timer is programmable 0 to 255 seconds. If the radio is not uprighted within this period of time, the radio will key up and send a message to the base.

In GE Star® the man down message ID can be programmed to be different than the radio PTT ANI. If the ID’s are different and a man down message is sent, the VMDE-200 will expect an acknowledgment to the man down ID not the PTT ID.

In GE Star® and DTMF, this message can be unique and distinguishable from a general emergency message. In MDC-1200®, an emergency message will be sent.

The man down message transmission will be repeated a programmed number of times with a programmed period between transmissions. The repeats will be transmitted regardless of radio status. Available times are as follows:

Number of repeat man down transmissions. (1, 5, 10, 15, 20, forever) *[Default = 5].* Time between man down repeats. (5s, 10, 20, 30s) *[Default=10s].*

In conjunction with a properly configured radio personality, the radio will change channels prior to sending the man down message.

Due to the nature of the Man Down critical message, it takes precedence over an Emergency message. This means that if a radio is in the emergency cycle when a Man Down occurs, the

emergency is terminated and replaced with the Man Down cycle.

The Man Down cycle is terminated at the conclusion of the repeats; upon receipt of an acknowledgment or by pressing <A><D>. Cycling power also will terminate the cycle.

If the number of repeat transmissions is set to 1 (one), the transmission will be considered non-critical. The radio display will present “Msg Sent” instead of “Man-Down”. The message type can be changed to a unique value.

Emergency and Man Down Open Microphone Monitor

If this feature is enabled, when an emergency or Man Down is activated, the radio will key up and transmit ambient noise for a programmed period of time. It will then unkey and remain unkeyed for a programmed amount of time and then repeat the process. It will alternate between TX and RX throughout the cycle. The length of the cycle is determined by the settings of “Number of repeat emergency (or man down) transmissions” and “Time between emergency (or man down) repeats”. If the value is set to zero, there will be no open microphone monitor.

Time-Out-Timer and Stuck-Microphone

The Time-Out-Timer feature terminates a transmission that is longer than the programmed time. Available times are 30s, 60s, 90s, 120s. *[Default = 60s].* The radio will automatically unkey and a low frequency (500 Hz) tone will be heard in the local speaker for four seconds or until the radio is unkeyed. The value of the time-out-timer is programmable in the radio personality programming.

To permit identification of the offending radio, prior to un-keying the transmitter, the VMDE-200 will send the radio ID.

DTMF Operations

The VMDE-200 is capable of generating DTMF tones in three modes.

Manual Keypad DTMF

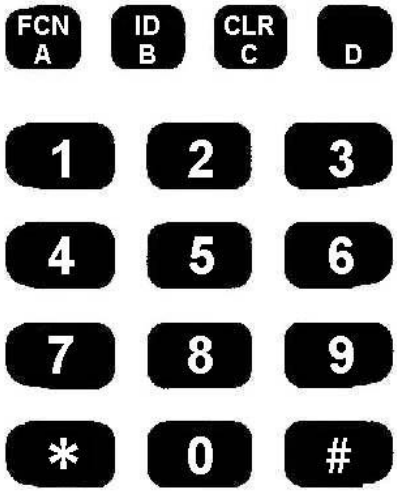
DTMF tones are generated when keypad buttons are pressed with the radio keyed. The DTMF tone continues to be transmitted until the button is released. The radio microphone is muted for the duration of the button press. This feature can also be used on channels that use GE Star or MDC-1200 ANI signaling. Enabling this feature and not designating ANI type (or designating the channel as a non-signaling channel) for the channel will permit manual DTMF generation without PTT ANI.

DTMF Keypad auto transmit

If enabled, the radio will automatically go into transmit and DTMF will be generated when keypad buttons are pressed. ANI will not be generated for any automatic transmit session. After a button is released, the radio will remain keyed for one second to await further button presses. The length of the transmitted DTMF tone is the value programmed as “DTMF character duration”. The radio microphone is muted for the duration of the function. If PTT ANI is enabled, the ANI will be generated as programmed (beginning send or end send) for radio PTT button presses.

DTMF ANI

Typically, in DTMF ANI, the PTT ID and the Emergency ID are different so the base decoder can determine what is an emergency message. Systems using dispatch consoles generally define a DTMF PTT ID as a number beginning with a 1 and DTMF Emergency ID's begin with a 7. The length of a DTMF character is programmable 25 mS through 1000 mS in 25 mS steps. The pause between DTMF characters is programmable 25 mS through 1000 mS in 25 mS steps. DTMF ANI can be programmed for up to eight digits.



MDC-1200® Radio Check

To send a radio check, press the <A> button until "CHECK" appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the four character ID and then press <C> and reenter the ID. After the ID is entered, momentarily press the radio PTT to send the message. Data is sent and then the radio unkeys. If an acknowledgment is received from the target radio, the display changes to —ACK—. If no acknowledgment is received in five seconds, the display changes to alternating between the target ID (or Alias) and —NAC— for five seconds. If the target ID that was entered contains "wildcards" signifying that it is a group or all-call, the acknowledge bit in the signaling packet will be cleared and no ACK will be expected. ID's that contain E or F can be entered by pressing * for E and # for F.

If the radio receives a radio check command with a matching ID, the radio shows no indication of being checked except that the TX led may illuminate. The radio will send the appropriate acknowledgment to the requesting radio.

MDC-1200® Call Alert

The VMDE-200 is capable of both “Long call alert” and “Short call alert”. The personality programming of the radio permits the selection of which call alert will be used for transmit. In receive, the VMDE-200 will react to either type, but a received short call alert will not have sender ID information.

To Send a call alert, press the <A> button until “ALERT” appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the four character ID and then press <C> and reenter the ID. After the ID is entered, momentarily press the radio PTT to send the message. Data is sent and then the radio unkeys. If an acknowledgment is received from the target radio, the display changes to —ACK— . If no acknowledgment is received in five seconds, the display changes to alternating between the target ID (or Alias) and —NAC—for five seconds. If the target ID that was entered contains “wildcards” signifying that it is a group or all-call, the acknowledge bit in the signaling packet will be cleared and no ACK will be expected. ID’s that contain E or F can be entered by pressing * for E and # for F.

If the radio receives a call alert command with a matching ID, the radio responds by emitting a series of tones. If the received alert was a “long call alert”, the display will alternate between the sending ID (or Alias) and —CALL—. If the received alert was a “short call alert”, the display will only show —CALL—. The call alert tone is repeated every 10 seconds. Pressing the <CLR> button or keying the radio silences the alert tones and reverts the display to channel information. The radio will send the appropriate acknowledgment to the requesting radio.

MDC Voice Select Call

In a system that uses Voice select call, all radios remain muted until their ID is received. Then the radio unmutes until loss of receive carrier.

To converse with another user in a voice select call system, press the <A> button until VSC appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the four character ID and then press <C> and reenter the ID. After the ID is entered, press the PTT and talk. VSC data will be transmitted to open the target radio and communications may proceed. This VSC mode remains in effect to permit continued conversations until the <C> button is pressed. While in VSC mode, the display will show alternating between the target ID (or Alias) and —VSC—. ID’s that contain E or F can be entered by pressing * for E and # for F.

When the radio receives a Voice select call command with a matching ID, the radio responds by emitting a series tones and

allows the receive audio to pass to the speaker. The display will show alternating between the calling ID (or Alias) and —VSC—. The speaker remains unmuted until loss of carrier. The user may press the PTT and talk without any special button presses. VSC data will be transmitted to open the target radio and communications may proceed. This VSC mode remains in effect to permit continued conversations until the <C> button is pressed. Once radios are in the VSC mode described above, continued conversations are not prefaced with the receive alert series tones. Receipt of a Voice Select Call is not acknowledged.

If an emergency message is received during VSC operations, all VSC connections will be cancelled.

GE Star® Interrogate

To Send an interrogate command, press the <A> button until “CHECK” appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the five-character ID and then press <C> and reenter the ID. After the ID is entered, momentarily press the radio PTT to send the message. Data is sent and then the radio unkeys. If an acknowledgment is received from the target radio, the display changes to —ACK— . If no acknowledgment is received in five seconds, the display changes to alternating between the target ID (or Alias) and —NAC—for five seconds.

If the radio receives an interrogate command with a matching ID, the radio shows no indication of being checked except that the TX led may illuminate. The radio will send the appropriate acknowledgment to the requesting radio. If the radio receives an interrogate command with an ID that matches the programmed GE Star® group ID (or 00000 for “all-call”), the VMDE-200 will not send an acknowledgment or take any action.

GE Star® Selective Call

To send a selective call, press the <A> button until “CALL” appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the five-character ID and then press <C> and reenter the ID. After the ID is entered, momentarily press the radio PTT to send the message. Data is sent and then the radio unkeys. If an acknowledgment is received from the target radio, the display changes to —ACK— . If no acknowledgment is received in five seconds, the display changes to alternating between the target ID (or Alias) and —NAC—for five seconds.

If the radio receives a selective call with a matching ID, the radio responds by emitting a series of tones from the speaker and the display will show —CALL—. The call alert tone is repeated every 10

seconds. The radio will send the appropriate acknowledgment to the requesting radio. If the radio receives a selective call command with an ID that matches the programmed GE Star® group ID (or 00000 for “all-call”), the VMDE-200 will not send an acknowledgment. Pressing the <C> button or pressing the radio PTT button silences the alert tones and reverts the display to channel information.

If GE Star® “Selective call to unmute” has been enabled, the radio receive audio remains muted until receipt of a selective call. It will then remain unmuted until receipt of a Call Cancel.

GE Star® Call Cancel

To cancel a previously sent GE Star® Selective Call, press the <A> button until “CALLCNCL” appears in the display then press the <B> button to select the target radio. If an alias table is present, the radio enters the alias mode of ID selection. If there is no alias table, any valid ID can be entered. If you desire to enter an ID instead of the alias, press and hold the <B> button for longer than 2 seconds. Refer to page 28 for more information. If an error is made in the ID entry, continue to fill out the five-character ID and then press <C> and reenter the ID. After the ID is entered, momentarily press the radio PTT to send the message. Data is sent and then the radio unkeys. If an acknowledgment is received from the target radio, the display changes to —ACK— . If no acknowledgment is received in five seconds, the display changes to alternating between the target ID (or Alias) and —NAC—for five seconds.

If the radio receives a selective call cancel with a matching ID, the radio responds by reverting the display (if it still shows —CALL—) and silences the repeating alert tone. The radio will send the appropriate acknowledgment to the requesting radio. If the radio operator had already cleared the display and repeating alert tone, the receiving radio takes no action.

If GE Star® “Selective call to unmute” has been enabled, the radio receive audio will become muted until receipt of a subsequent selective call.

GE Star® and MDC-1200® Open Microphone Monitor

Open Microphone Monitor is a receive only function. If the radio receives an open mic monitor command, the radio will key up, send an acknowledgment and then activate the microphone to transmit ambient noise for a period of 15 seconds. After which, the radio unkeys.

GE Star® and MDC-1200® Radio Disable/Enable

Radio disable and enable are receive only functions. Only base dispatch systems with appropriate equipment are capable of transmitting these commands.

Upon receipt of a Radio Disable command, the radio receive functions will remain muted and transmit functions will bbe disabled. The VMDE-200 continues to monitor receive audio for subsequent commands and acts upon them. Receipt of a Radio enable command returns the radio to normal operation. The radio will send the appropriate acknowledgment to the transmitting station.

DTMF Specifics

DTMF in the VMDE-200 is encode capable only. There are no

decode features and no Aliasing features.

Decode ID Display Operations

The VMDE-200 decodes and displays received ANI during idle periods when the radio display is showing channel information. If an alias table entry exists for the received ID, the alpha-numeric alias will be substituted for the numerical ID. The display alternates between the message type and the ID. For received PTT ANI, only the ID is displayed. The display shows the ID and type for the entire period the radio is in receive mode from the identified radio. After the transmitting radio unkeys, the display reverts to channel information. The ID will be displayed for a minimum of 5 seconds unless overwritten by another message or the receiver becomes inactive and then active again. The last received information can be recalled by pressing the <B> button. The display will revert to channel information again after 5 seconds. Decode ID display operations do not occur while the operator is actively entering information via the keypad, or when the unit is in an emergency or man-down cycle. If a message is received while in this mode, the operator may view the last message by exiting the entry routine and then pressing the <B> button. While waiting for an ACK message, the display will show “SENDING”. In this mode, received ID’s will not be displayed and receipt of an ACK will overwrite the recall information that would be displayed by pressing the <B> button. ID’s and the message types are handled as follows:

GE Star®

On a GE Star® signaling channel, message types will be displayed as described in the following table. Highlighted message types are not displayed. The display will alternate between the message type and the ID. PTT ANI displays only the ID. Undefined message types are displayed, alternating with the received GE Star® message code.

STAR CODE	CE73 GE Star Message code	Radio Display	REMARKS
000-0000	00	STATUS 0	Status
001-0000	10	STATUS 1	Status
010-0000	20	STATUS 2	Status
011-0000	30	STATUS 3	Status
100-0000	40	STATUS 4	Status
101-0000	50	STATUS 5	Status
110-0000	60	STATUS 6	Status
111-0000	70	STATUS 7	Status
000-0001	01	(none)	ANI ID and Sel Call / Ack
000-0010	02	INTG ACK	Interrogate / Ack
000-0011	03	REQ TALK	Request to talk
000-0100	04	MSSAGE C	Canned Message
000-0101	05	MSSAGE D	Canned Message

000-0110	06	TAXI BID	Taxi Bid
000-0111	07	EMRGENCY	Emergency
000-1000	08	CNCL ACK	Call Cancel / Ack
000-1001	09	STUCKMIC	Stuck Microphone
000-1010	0A	MNTR ACK	Open Mic Monitor / Ack
000-1011	0B	MSSAGE F	Canned Message
000-1100	0C	MSSAGE G	Canned Message
000-1101	0D	MSSAGE H	Canned Message
000-1110	0E	MSSAGE J	Canned Message
000-1111	0F	MAN DOWN	Man Down
100-1010	4A	DSBL ACK	Radio Disable / Ack
101-1010	5A	ENBL ACK	Radio Enable / Ack
(not listed)	(not listed)	0x HH*	Undefined

* where HH is the received GE Star® message code.

MDC-1200®

The only ANI displayed are PTT ANI and Emergency ANI (types 0x8000 and 0x8001). PTT ANI displays only the ID.

Aliasing Capabilities

Alias entries consist of an 8 or 10 character field for an alpha/numeric alias and the associated signaling ID. When programming the alias table, the user must define whether 8 or 10 character alias field is appropriate for the radio in use.

The Vertex/Standard CE-73 programming software is used to create the alias tables and load and retrieve the tables from the radio. If tables are retrieved from the radio, their entries can be edited using the CE-73 and then reloaded into the radio. Alias table manipulation is accessed by selecting menu item “ALIAS” then selecting the appropriate signaling type. The user is requested to select whether eight character or ten character aliases will be allowed. The CE-73 software will organize the table for viewing in alphabetical order by ID field or alias.

Upon receipt of an ANI data burst, the VMDE-200 searches the appropriate alias table to see if the ID is present. If it is, the alias is displayed on the radio instead of the ID. If there is no entry in the table, the ID is displayed.

For the transmit capabilities, after you press the <A> button to select the desired outbound message type, if an alias table exists, a short press of the <B> button allows you to access the alias table. In this mode, aliases can be selected from the previously loaded alias table. Additional presses of the <B> button move through the last 10 targeted aliases. After the top ten, the entire alias table is available in alphabetical order. Press the <A> button to scroll up through the list and press the <D> button to scroll down through the list. To skip to the bottom of the table, press the <#> key. To skip to the top of the table, press the <0> key. Pressing number keys 1 through 9 allows you to rapidly skip through the table. Press the <*> key to skip to the top of the top ten list. This skipping motion is described

below, where the number in the table is the entry number to which you are brought when the associated button is pressed:

	Number of Aliases in Table			
Button Pressed	**50**	**100**	**150**	**200**
1	5	10	15	20
2	10	20	30	40
3	15	30	45	60
4	20	40	60	80
5	25	50	75	100
6	30	60	90	120
7	35	70	105	140
8	40	80	120	160
9	45	90	135	180

After pressing the skip button(s), the <A> button scrolls up from that spot and the <D> scrolls down. At any time, the <*> brings you to the top of the top ten list and the <#> brings you to the bottom of the table.

Press the <C> button to exit the alias mode.

When the desired target Alias is displayed in the radio display, pressing the PTT button completes the call to the targeted radio.

If an alias table exists but you desire to enter the actual ID, press and hold the <B> button for more than 2 seconds to place the radio in ID mode for ID selection.

Canned Message Capabilities

In GE Star® and DTMF signaling modes, the message type can be changed to a unique value and emergency activation can be programmed for an available radio button and man down input can be attached to an external switch to send canned messages. In MDC-1200®, this is limited to the definition of the emergency message. To send canned messages, the message repeat counter should be set to 1 and the message will be considered non-critical. The radio display will present “Msg Sent” instead of “Emrgency” or “Man-Down”. Man down input terminals on the VMDE-200 are feed-throughs T1 and T2 where T1 is the high side and T2 is ground. T1 must not be attached to any point that exceeds 3.6 VDC or microprocessor damage will result.

Non-critical messages as described above are transmitted on the current radio channel and do not expect an acknowledgment. However, if an acknowledgment is received the radio display will show –ACK- .

C H A P T E R 4
Technical Information

GE Star® Message Types

The GE Star bits designated S2, S3, S4 and M1 through M4 are used to code various messages. The VMDE-200 can be programmed so that different message types are transmitted for PTT ANI, Emergency ANI, Man Down and TOT ANI. The desired star code is selected via the CE73 Vertex programming software. The table below describes the Star codes, the value to enter in the CE73 software and the corresponding decoder displayed message:

STAR CODE	CE73 GE Star Message code	C Plus Decoder display	REMARKS
000-0000	00	STATUS 0	Status
001-0000	10	STATUS 1	Status
010-0000	20	STATUS 2	Status
011-0000	30	STATUS 3	Status
100-0000	40	STATUS 4	Status
101-0000	50	STATUS 5	Status
110-0000	60	STATUS 6	Status
111-0000	70	STATUS 7	Status
000-0001	01	(none)	ANI ID and Sel Call / Ack
000-0010	02	INTG ACK	Interrogate / Ack
000-0011	03	REQ TALK	Request to talk
000-0100	04	MSSAGE C	Canned Message
000-0101	05	MSSAGE D	Canned Message
000-0110	06	TAXI BID	Taxi Bid
000-0111	07	EMRGENCY	Emergency
000-1000	08	CNCL ACK	Call Cancel / Ack
000-1001	09	STUCKMIC	Stuck Microphone
000-1010	0A	MNTR ACK	Open Mic Monitor / Ack
000-1011	0B	MSSAGE F	Canned Message
000-1100	0C	MSSAGE G	Canned Message
000-1101	0D	MSSAGE H	Canned Message
000-1110	0E	MSSAGE J	Canned Message
000-1111	0F	MAN DOWN	Man Down
100-1010	4A	DSBL ACK	Radio Disable / Ack
101-1010	5A	ENBL ACK	Radio Enable / Ack
(not listed)	(not listed)	UNDEFINE	Undefined

GE Star® Format Types

Radio systems using GE Star® can define the T1, T2 and S1 bits to have different values or various meanings. Industry-wide, there are sixteen accepted variants with Format “B” being the industry defacto standard. The VMDE-200 is programmable for any of the sixteen variants.

Format Definitions

The following table defines the sixteen GE Star® formats.

Format	Description	T1	T2	S1	Comments
A	IDs to 2047 (1st 11 bits).	X	X	X	T1, T2, and S1 ignored
B	IDs to 16383 (14 bit ID)	8192	4096	2048	Expanded-ID STAR #1.
C	IDs to 16383 (14 bit ID)	4096	8192	2048	GE-STAR #3.
D	IDs to 16383 (14 bit ID)	4096	2048	8192	Compatible with GE-STAR #4
E	IDs to 4095 (12 bit ID, T2 = "0")	2048	M0	X	GE-STAR #1. T2 = "0" for Mobile.
F	IDs to 4095 (12 bit ID, T2 = "1")	2048	P1	X	GE-STAR #1. T2 = "1" for Portable.
G	IDs to 8191 (13 bit ID, T2 = "0")	4096	M0	2048	GE-STAR #2. T2 = "0" for Mobile.
H	IDs to 8191 (13 bit ID, T2 = "1")	4096	P1	2048	GE-STAR #2. T2 = "1" for Portable.
I	IDs to 4095 (12 bit ID), Tags="00"	0	0	2048	System "0"
J	IDs to 4095 (12 bit ID), Tags="01"	0	1	2048	System "1".
K	IDs to 4095 (12 bit ID), Tags="10"	1	0	2048	System "2".
L	IDs to 4095 (12 bit ID), Tags="11"	1	1	2048	System "3".
M - P	IDs to 2047 (11 bit ID)			X	Identical to I - L with capability only to program IDs to max of 2047.

Value Assignment	Description
8192	If bit is set, add 8192 to ID
4096	If bit is set, add 4096 to ID
2048	If bit is set, add 2048 to ID
M0	If the bit is not set, originator is a Mobile
P1	If the bit is set, originator is a Portable
X	This bit is ignored

For system types E through H, the VMDE-200 will look for the T2 bit to designate if the received message is from a mobile or portable. The radio display will describe the source. Typically, a radio system that uses these descriptors will use formats E and F or G and H. If the VMDE is programmed for format E and it receives a PTT ANI from a mobile radio programmed for format E, the radio display will show the unit ID and an “M” because the originator was a mobile

radio. If it receives a PTT ANI from a portable radio programmed for format F, the radio display will show only the unit ID.

If Aliases are used, the right most character in the display will be used to show the descriptor (M or P). If the radio has an 8 character display and the programmed alias has 8 characters, the right most character of the alias will be blanked and the descriptor will be shown in its place.

For system types I through P, the VMDE-200 looks for a match in the T1 and T2 bits. If the bits match then the VMDE-200 will react to the received message. If not, the message is ignored. This is for communications systems that have multiple unrelated users so that different users do not see ID's from other users.

MDC-1200® Message Type

To increase flexibility of the VMDE-200 and enhance compatibility with existing communications systems, the format of encoded MDC-1200® messages can be modified. The default message type for a PTT ANI is represented by 0x8001 and the default message type for an Emergency ANI is 0x8000. These parameters should not be changed without a thorough understanding of the signaling system and existing signaling codes.

Radio Connections

Conn Pin	Signal	Description
1	Ground	Ground
3	TRX	TX/RX Status Input: TX=”H” RX=”L”
9	Ground	Ground
12	DISC	Radio Discriminator
14	AFOut	Audio out from VMDE-200
16	AFIn	Audio in to VMDE-200
17	SD	Sub CPU Clock Shift
18	MicOut	TX audio out from VMDE-200
20	MicIn	Mic TX audio in to VMDE-200
22	OpTypeStb	Option board sense
24	KEY4M	Key Matrix Col 4
25	OpTyp	Option board sense
26	KEY3M	Key Matrix Col 3
28	KEY2M	Key Matrix Col 2
30	KEY1M	Key Matrix Col 1
31	SIG	Sig Mon noise squelch
32	KS4M	Key Matrix Row 4
33	SUBCPU Reset	Sub CPU Reset
34	KS3M	Key Matrix Row 3
35	RXD	Receive data from VMDE-200
36	KS2M	Key Matrix Row 2
37	TXD	Transmit data to VMDE-200
38	KS1M	Key Matrix Row 1
39	Ground	Ground
40	VDD1	3.5VDC ± 10%

Micro to Micro Communications

The microprocessor of the host radio and the microprocessor of the VMDE-200 communicate with each other using one-byte hex commands. This interaction allows the VMDE-200 to control many functions of the host radio.

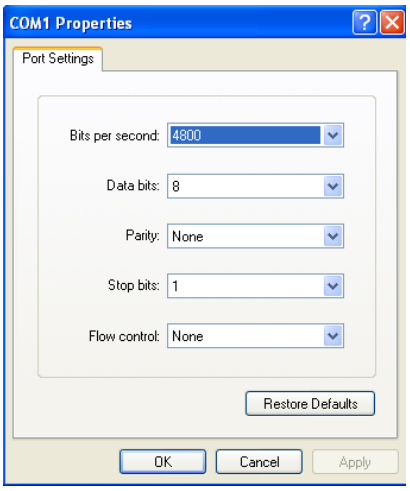
Software Version Verification

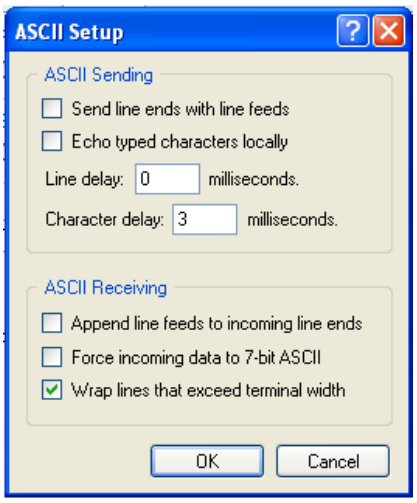
To verify the version of the microprocessor software, press the <#> (pound) key followed by the <*> (asterisk) key. The embedded software check sum will be displayed in the radio display.

Reloading Flash

If upgraded flash software becomes available, the new software can be loaded into the VMDE-200 by performing the following:

Start the terminal emulation program “Hyperterm”. This program must be set up for direct connect to Com 1 at 4800, N,8,1 with no handshaking. After the program is set up, Go to “File”, select “Properties” then select the tab labeled “Settings”. Change emulation type to “TTY”. Click the “ASCII Setup” button and change the character delay to 3 mS.





Connect the programming cable between the radio and the PC COM port.

Place the radio in Sub Clone mode (usually by pressing the PTT button and the orange button simultaneously and then turning power on). The radio display will show: “SUB CLON”.

WARNING:
Do not turn the radio off until you have successfully loaded a new VMDE-200 program. If power is turned off, the board will need to be returned to Cimarron Technologies for reprogramming.

At the Hyperterm computer, press “A” (upper case). The radio will respond with “Reprogram?”. To erase Sub CPU program memory and proceed, press “Y”, “C”, “I”, “M”. The radio will respond with “0” indicating that the flash has been erased and the unit is ready to receive a new program. Pressing any other sequence of keys exits without erasing the Sub CPU program memory.

If you have extensive alias information programmed into the VMDE-200, the above procedure will erase those tables. To avoid losing the alias data, press “B” instead of “A” (BYCIM instead of AYCIM).

From Hyperterm menu, select <Transfer><Send Text File>. Select the specified binary file and begin sending. Ignore characters streaming across screen (these are binary characters echoed by some programming cables).

When the load is successfully completed, the final character on the hyperterm display will show “1”. The program load will take about seven minutes. If the load was not successful, the display will show “0” and the flash will be again erased and await the download. DO NOT POWER-OFF THE RADIO UNTIL A NEW SUB-CPU PROGRAM HAS BEEN SUCESSFULLY LOADED.

High-Speed Flash Reloading

If you have a large number of VMDE-200’s to reflash, a high-speed procedure has been developed that requires a special programming cable (available from Vertex/Standard) and a VX-900 portable. This method takes about 15 seconds per board. Set up Hyperterm in the same manner as before, but set the baud rate for 38.4K and change the Character Delay to 0mS.

Connect the special sub-flash programming cable between the radio and the PC COM port.

Place the VX-900 in Sub Flash mode by pressing the orange button simultaneously and then turning power on). The radio display will

show: “SUBFLASH”.

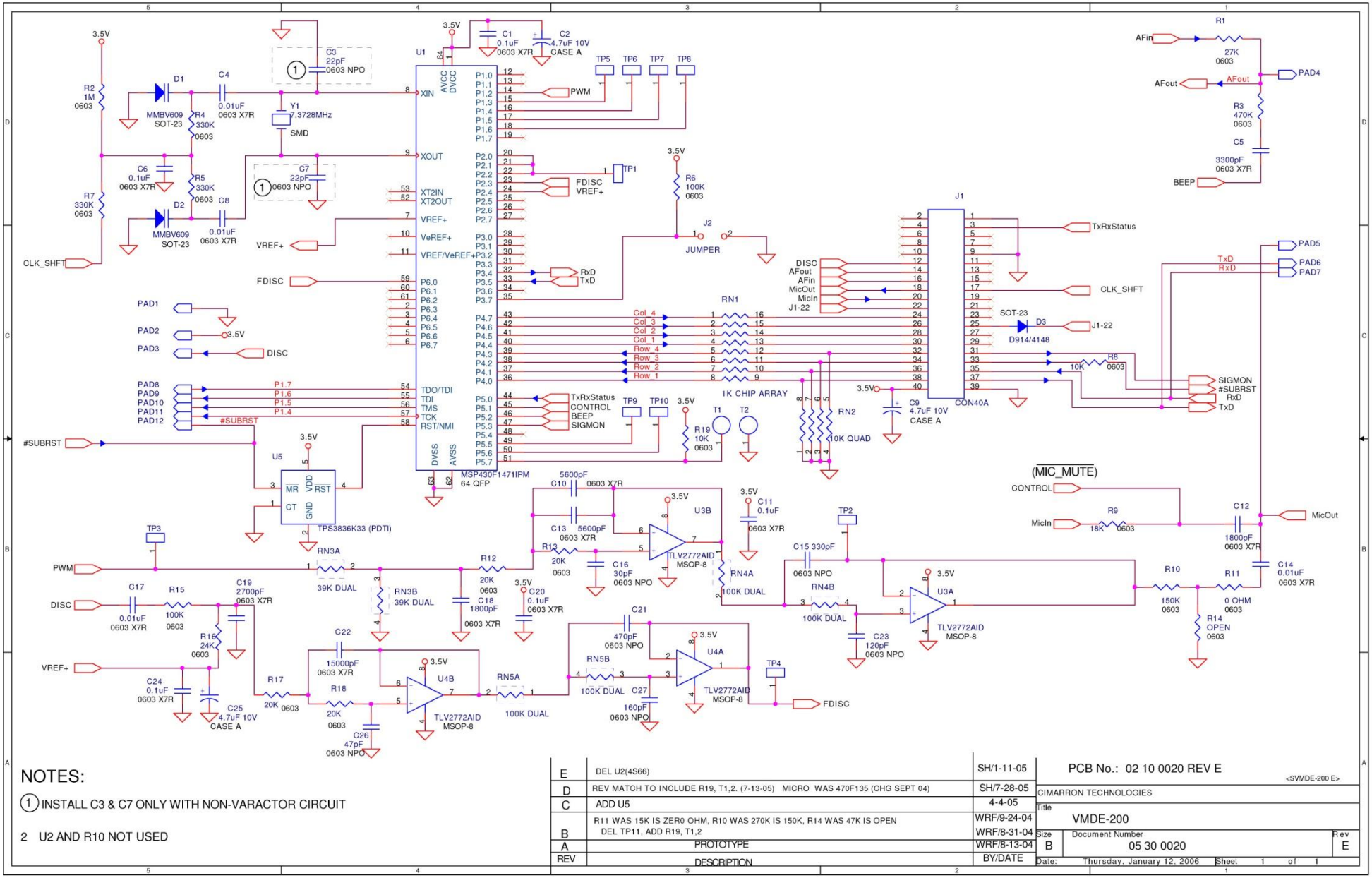
At the Hyperterm computer, press “<ctrl A>” “<space>” “A” (upper case). The radio will respond with “Reprogram?”. To erase Sub CPU program memory and proceed, press “Y”, “C”, “I”, “M”. The radio will respond with “0” indicating that the flash has been erased and the unit is ready to receive a new program. Pressing any other sequence of keys exits without erasing the Sub CPU program memory.

If you have extensive alias information programmed into the VMDE-200, the above procedure will erase those tables. To avoid losing the alias data, enter “<ctrl A>” “<space>” “B” instead of “<ctrl A>” “<space>” “A” and then continue with the “Y”, “C”, “I”, “M” as described above.

From Hyperterm menu, select <Transfer><Send Text File>. Select the specified binary file and begin sending. Ignore characters streaming across screen (these are binary characters echoed by some programming cables).

When the load is successfully completed, the final character on the hyperterm display will show “1”. If the load was not successful, the display will show “0” and the flash will be again erased and await the download. DO NOT POWER-OFF THE RADIO UNTIL A NEW SUB-CPU PROGRAM HAS BEEN SUCESSFULLY LOADED.

Schematic


NOTES:
1 INSTALL C3 & C7 ONLY WITH NON-VARACTOR CIRCUIT
2 U2 AND R10 NOT USED
E DEL U2(4S66) SH/1-11-05
D REV MATCH TO INCLUDE R19, T1,2. (7-13-05) MICRO WAS 470F135 (CHG SEPT 04) SH/7-28-05
C ADD U5 4-4-05
B R11 WAS 15K IS ZER0 OHM, R10 WAS 270K IS 150K, R14 WAS 47K IS OPEN DEL TP11, ADD R19, T1,2 WRF/9-24-04 WRF/8-31-04
A PROTOTYPE WRF/8-13-04
REV DESCRIPTION BY/DATE
PCB No.: 02 10 0020 REV E
<SVMDE-200 E>
CIMARRON TECHNOLOGIES
Title VMDE-200
Size B Document Number 05 30 0020 Rev E
Date: Thursday, January 12, 2006 Sheet 1 of 1
MSP430F1471IPM 64 QFP
TPS3836K33 (PDTI)
TLV2772AID MSOP-8
1K CHIP ARRAY
10K QUAD
CON40A
(MIC_MUTE)

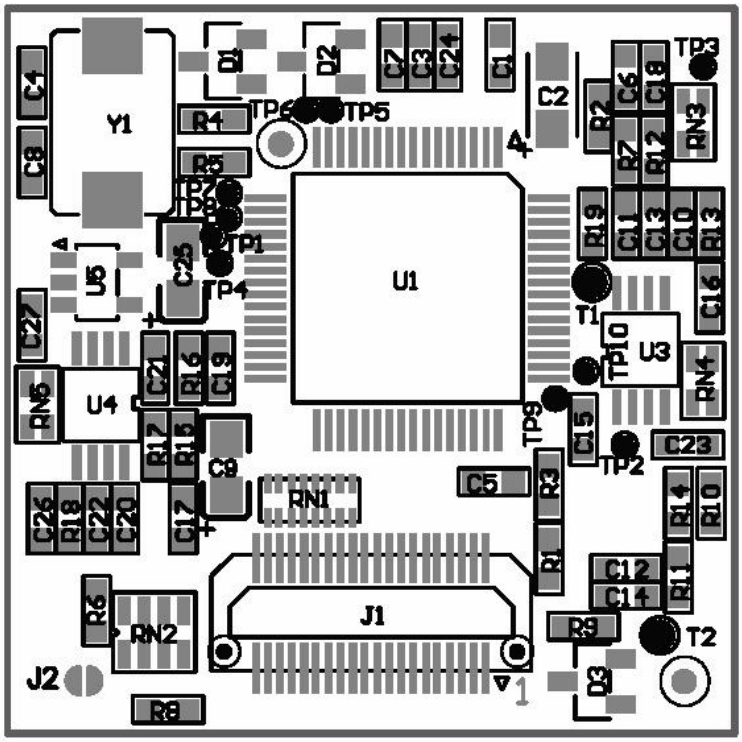
Parts List

QTY		Reference	Part				
1		PCB	02 10 0020				
2	B	"C3,7"	CAP	5%	NPO	22pF	0603
1		C16	CAP	5%	NPO	30pF	0603
1		C26	CAP	5%	NPO	47pF	0603
1		C23	CAP	5%	NPO	120pF	0603
1		C27	CAP	5%	NPO	160pF	0603
1		C15	CAP	5%	NPO	330pF	0603
1		C21	CAP	5%	NPO	470pF	0603
2		"C12,18"	CAP	10%	X7R	1800pF	0603
1		C19	CAP	10%	X7R	2700pF	0603
1		C5	CAP	10%	X7R	3300pF	0603
2		"C10,13"	CAP	10%	X7R	5600pF	0603
2	A	"C4,8"	CAP	10%	X7R	0.01uF	0603
2		"C14,17"	CAP	10%	X7R	0.01uF	0603
1		C22	10%	X7R	0.015uF	0603	
5		"C1,6,11,20,24"	CAP	10%	X7R	0.1uF	0603
3		"C2,9,25"	CAP TANT	10V	20%	4.7uF	CASE A (EIA)3216
1		RN1	RES CHIP ARRAY .020" PITCH			1K	8 RES SMD
1		RN2	RES QUAD .032" PITCH			10K	4 RES SMD
1		RN3	RES DUAL .032" PITCH			39K	SMD
2		"RN4,5"	RES DUAL .032" PITCH			100K	SMD
1		R11	RES	5%	1/16W	ZERO OHM	0603
2		"R8,19"	RES	5%	1/16W	10K	0603
1		R9	RES	5%	1/16W	18K	0603
4		"R12,13,17,18"	RES	5%	1/16W	20K	0603
1		R16	RES	5%	1/16W	24K	0603
1		R1	RES	5%	1/16W	27K	0603
0		R14	RES	5%	1/16W	OPEN	0603
2		"R6,15"	RES	5%	1/16W	100K	0603
1		R10	RES	5%	1/16W	150K	0603
3	A	"R4,5,7"	RES	5%	1/16W	330K	0603
1		R3	RES	5%	1/16W	470K	0603
1	A	R2	RES	5%	1/16W	1M	0603
1		U5	SUP CKT	TPS3836K33	3.3V	SOT-23-5	
2		"U3,4"	IC	OP AMP	TLV2772	MSOP-8	
1		U1	IC	uCONTROLLER	MSP430F1471	S-PQFP-64	MSP430F1471IPM
2	A	"D1,2"	TUNING DIODE		MMBV609	SOT-23	MMBV609LT1
1		D3	DIODE SM. SIG.		D914/4148	SOT-23	MMBD4148
1		J1	CONNECTOR		40 POS	SMD	AXK5S40035P

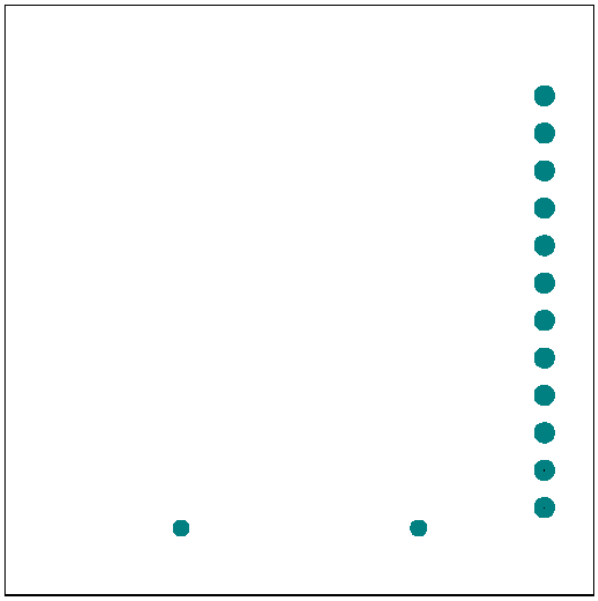
1	Y1	CRYSTAL	7.3728MHz	SMD

A =PULLED CRYSTAL CKT
B =SIMPLE CRYSTAL CKT

Parts Layout



Test Pinout



Pad Assignments	
Pad 12	Reset
Pad 11	JTAG
Pad 10	JTAG
Pad 9	JTAG
Pad 8	JTAG
Pad 7	RXD
Pad 6	TXD
Pad 5	Data Out
Pad 4	Beep
Pad 3	Disc
Pad 2	3.5 VDC
Pad 1	Ground

CHAPTER 5
Product Support

If you have any questions or comments about Cimarron products, please make use of our technical support hotline at (760) 738-3283.

Cimarron Technologies Corporation

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Escondido, CA 92029

Technical Support Hot-Line (760) 738-3283

service@cimtechcorp.com

www.cimtechcorp.com

WARRANTY

Cimarron Technologies Corporation warrants this product to be free from defects in material and workmanship for a period of three years from date of shipment. If a malfunction occurs due to defective material or workmanship, the product will be repaired or replaced (Cimarron's discretion) without charge if returned to the factory

This warranty does not apply to any failure or damage caused by accident, neglect, unreasonable use, improper installation, or to alterations or modifications to the unit. Nor does the warranty extend to damage incurred by force majeure (natural causes) such as lightning, fire, floods, or other such catastrophes, nor to damage caused by environmental extremes, power surges and/or transients

Cimarron Technologies Corporation makes no other warranty, either expressed or implied, with respect to this product. Cimarron Technologies Corporation specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

The remedies provided herein are customer's sole and exclusive remedies. In no event shall Cimarron Technologies Corporation be liable for any lost profits, direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

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